

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA**(An Autonomous Institute Affiliated to AKTU, Lucknow)****M. Tech****(SEM: Ist THEORY EXAMINATION (2020-2021))****Subject Name: Simulation, Modelling & Analysis****Time: 3 Hours****Max. Marks:70****General Instructions:**

- All questions are compulsory. Answers should be brief and to the point.
- This Question paper consists of 02 pages & ...8.....questions.
- It comprises of three Sections, A, B, and C. You are to attempt all the sections.
- **Section A** - Question No- 1 is objective type questions carrying 1 mark each, Question No- 2 is very short answer type carrying 2 mark each. You are expected to answer them as directed.
- **Section B** - Question No-3 is Long answer type -I questions with external choice carrying 4marks each. You need to attempt any five out of seven questions given.
- **Section C** - Question No. 4-8 are Long answer type -II (within unit choice) questions carrying 7 marks each. You need to attempt any one part a or b.
- Students are instructed to cross the blank sheets before handing over the answer sheet to the invigilator.
- No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.
- Assume the missing data suitably, if any, state them clearly.

SECTION – A

- 1. Answer all the parts-** **[5x1=5]** **CO**
- a.** Which of the following is not a principle used in modelling? **(1)** **CO1**
- (A) Block building
(B) Aggregation
(C) Relevance
(D) Analysis
- b.** Which of the following characteristics apply to queuing system? **(1)** **CO2**
- (A) Customer population
(B) Arrival Process
(C) Both (A) & (B)
(D) Neither (A) nor (B)
- c.** Validation is concerned with _____ the correct model. **(1)** **CO3**
- (A) analysing
(B) building
(C) calibrating
(D) evaluating
- d.** Which of the following is a simulation software? **(1)** **CO4**
- (A) APT
(B) GENPLAN
(C) SIMAN
(D) AUTOSPOT
- e.** The symbol used to comment line in MATLAB is **(1)** **CO5**
- (A) ≈
(B) %
(C) :
(D) C
- 2. Answer all the parts-** **[5x2=10]** **CO**
- a.** What do you understand by system? How does system environment affect the activities of the system? **(2)**
- b.** What does mean by capacity of queue? **(2)** **CO2**

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| c. | Distinguish static and dynamic model. | (2) | CO3 |
| d. | Mention the most significant feature of GPSS. | (2) | CO4 |
| e. | List any four areas where MATLAB software have been used? | (2) | CO5 |

SECTION – B

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| 3. | Answer any five of the following- | [5x4=20] | CO |
| a. | How is the maintainability of system related to reliability of the system? Discuss. | (4) | CO1 |
| b. | How is randomness of random number checked? | (4) | CO2 |
| c. | Explain the importance of validation and verification of the developed model in simulation study, | (4) | CO3 |
| d. | How is the simulation software selected for the particular application? | (4) | CO4 |
| e. | Discuss the utilities of MATLAB in solving mechanical vibration problem. | (4) | CO5 |
| f. | Discuss the importance of modeling and simulation for scientist and engineers | (4) | CO1 |
| g. | List applications, other than systems simulation, for pseudo- random numbers. | (4) | CO2 |

SECTION – C

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| 4. | Answer any one of the following- | [5x7=35] | CO |
| a. | (i) Derive expressions for variance and standard deviation of continuous distribution function.
(ii)A doctor recommends a patient to go on a particular diet for two weeks and there is equal likelihood for the patient to lose his weight between 2 kg and 4 kg. What is expected to loose on this diet? | (7) | CO1 |
| b. | Discuss exponential growth model, modified exponential growth model and decay model. | (7) | CO1 |
| 5. | Question- Answer any one of the following- | | |
| a. | A self-servicing store employs one cashier at its counter. Nine customers arrive at an average of 5 minutes while the cashier can serve 10 customers in 5 minutes. Assuming Poisson's distribution for arrival rate. Find
i. Average number of customers in system
ii. Average number of customers in queue
iii, Average time a customer spends in the system
iv. Average time a customer waits before being served | (7) | CO2 |
| b. | Generate a sequence of 10 random numbers using the concept of mixed congruential method and additive congruential method. The values of seed, constant multiplier, increment, and modulus are 1, 13, 1 and 19 respectively. | (7) | CO2 |
| 6. | Question- Answer any one of the following- | | |
| a. | (i) What are the various steps in the development of model? Describe them.
(ii)Does the assumptions taken in developing the model weaken the model? Discuss. | (7) | CO3 |
| b. | A model can be validated by
(i) Conversation with the system experts
(ii) Existing theory
(iii) Results from the similar experimental system
Discuss all these methods. | (7) | CO3 |
| 7. | Question- Answer any one of the following- | | |
| a. | Discuss the importance of simulation packages in solving real life problem. | (7) | CO4 |
| b. | Describe the basic operation in MATLAB. Also write down the salient features of MATLAB Software. | (7) | CO4 |
| 8. | Question- Answer any one of the following- | | |
| a. | How is the MATLAB used in solving heat transfer problem? Explain with the help of suitable example. | (7) | CO5 |
| b. | How optimization will be done by using MATLAB. With help of an example explain. | (7) | CO5 |

